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## (54) Computerised page layout composition

(57) An apparatus for setting page layouts from a number of input textual items, the apparatus having provision for storing the page parameters and the allowable range of parameters for each of the items respectively, and also having provision for storing the textual items for retrieval category by category; wherein the apparatus selects items by category and adjusts the item format to conform with the page parameters for each item serially until a page has been composed, and then presents the composed trial page for assessment by a human compositor; and wherein the machine has provision for accepting a rejection of the page makeup by the compositor, whereupon it composes a different trial page and presents it for inspection.

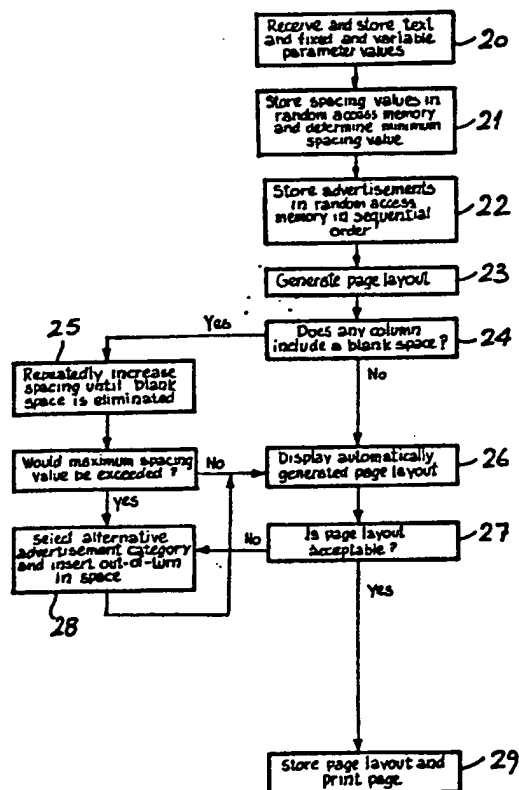
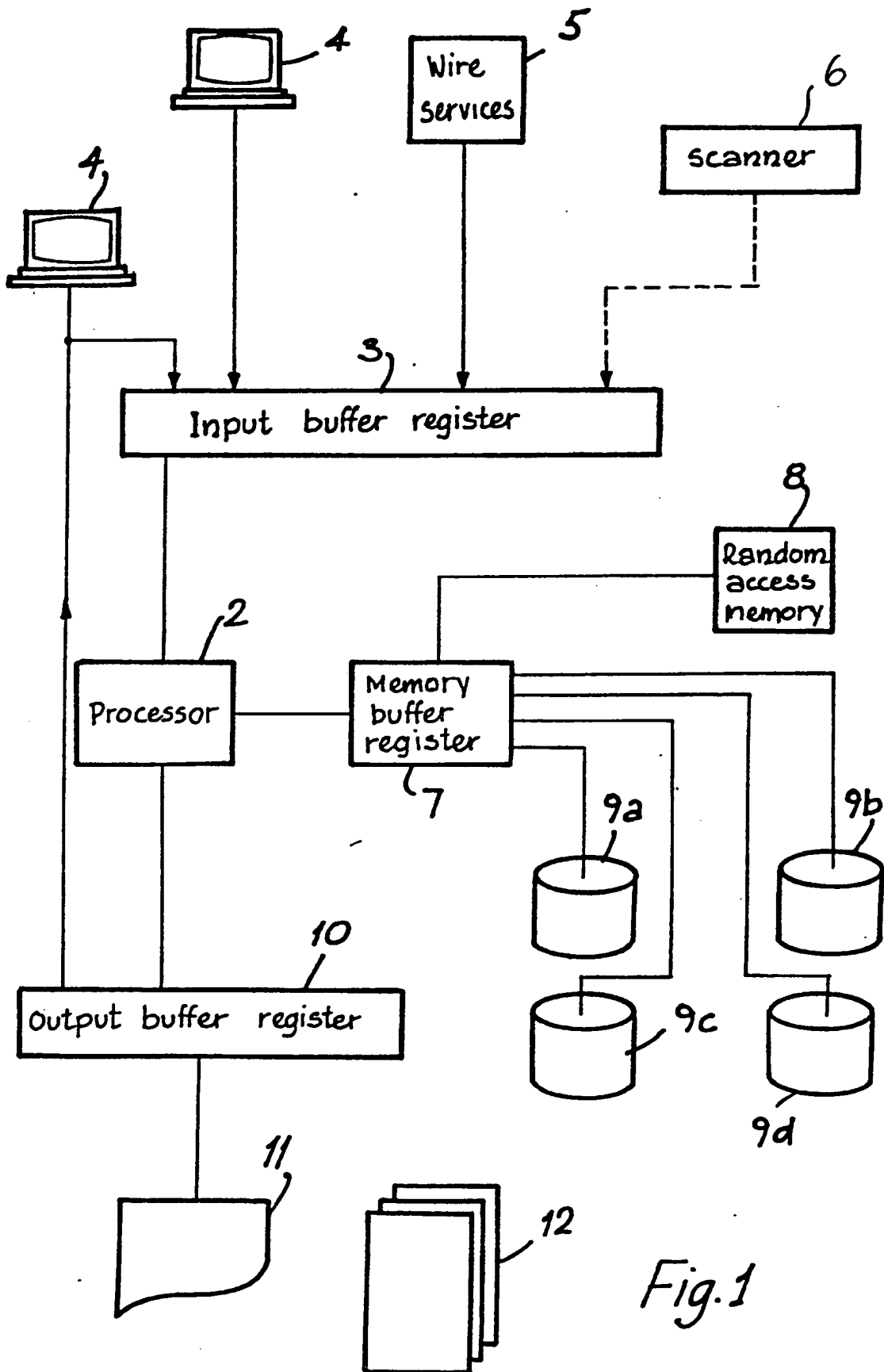


Fig.2

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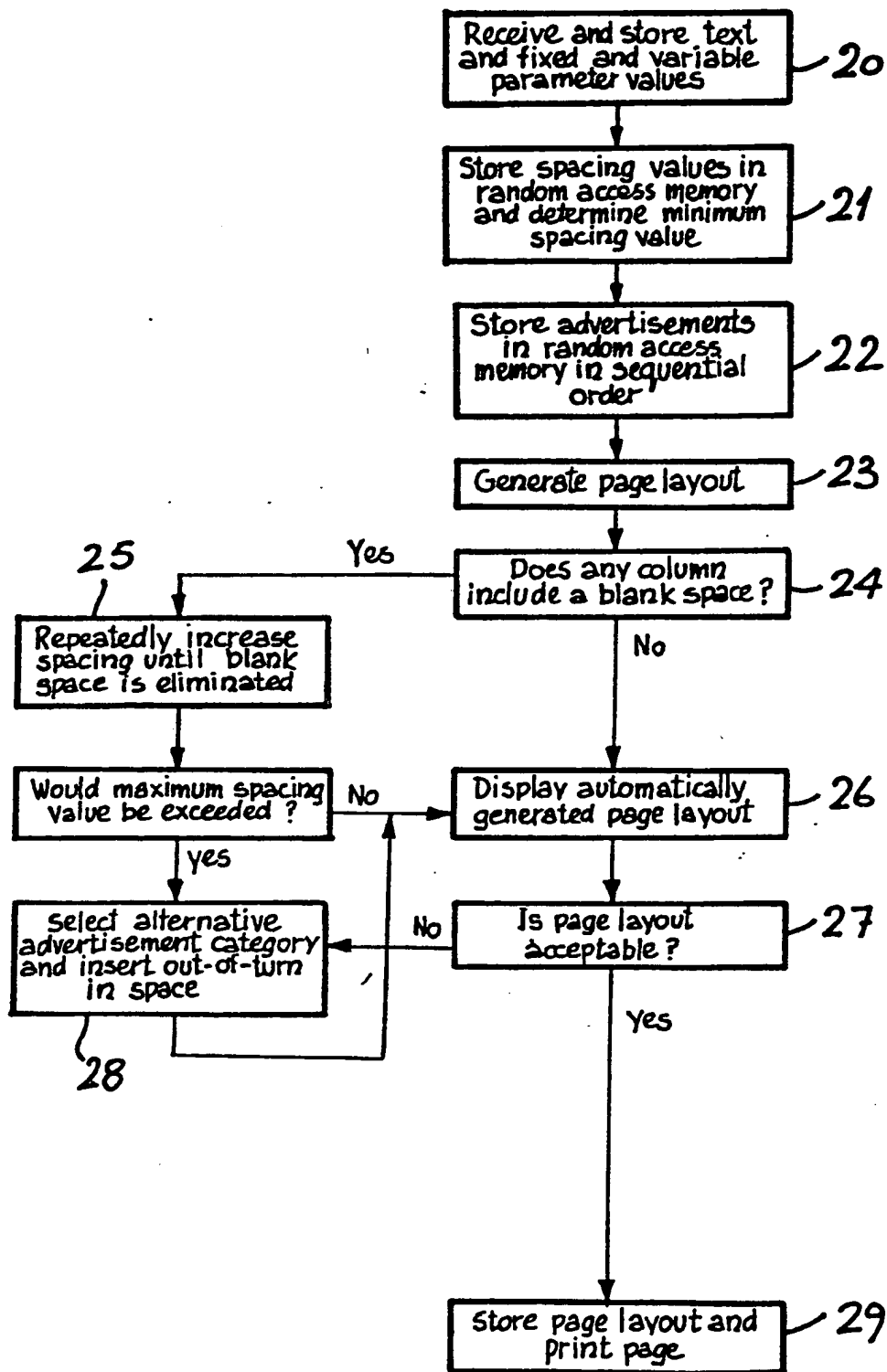


Fig. 2

- 1 -

"A typesetting apparatus and process"

The invention relates to a typesetting apparatus and process for the setting of complete newspaper page layouts of advertisements.

5 Presently available typesetting apparatus suffer from the disadvantages that they require considerable user input and do not operate to optimize use of newspaper page space. For example, British Patent Specification No. GB 2105263, (Toltec) describes a typesetting apparatus which comprises a text and  
10 graphic input means, a processor and output devices driven by a character generator. For typesetting, a user is required to select an area of a page layout on a monitor display for insertion of various information. The user is also required to carry out further work such as the changing of scales until  
15 satisfied with the layout. This process does not, therefore, eliminate the traditional problems with manual case room work including spacing inconsistency, unsatisfactory presentation, and inefficient use of page space.

Further, British Patent Specification No. GB 2,094,112 B  
20 describes a typesetting apparatus which is operative to direct

setting of a typeset page is time-consuming and optimum page usage is not achieved.

The present invention is directed towards providing an improved typesetting apparatus and process to overcome at least some of these problems.

According to the invention, there is provided a typesetting apparatus comprising an input means, a processor, a memory, and an output means, the typesetting apparatus being operable to set a newspaper page layout of advertisements with optimum use of page space by performing the steps of:-

receiving at the input means and storing in the memory, text of advertisements for inclusion in a newspaper;

receiving at the input means and storing in the memory, values of fixed typesetting parameters of newspaper page dimensions, character fonts for text, column widths, inter-column spacing, and a numeral representing category of each classified advertisement for which text has been received;

receiving at the input means a set of allowed values for variable typesetting parameters, namely, vertical spacing between advertisements and order

vertical spacing between advertisements and order of printing of the classified advertisements according to the category numeral;

5 the processor retrieving the text, the fixed parameter values, and the variable parameter values from the memory and automatically selecting an initial combination of variable parameter values, and generating and directing output at the output means of a newspaper page layout of advertisement  
10 text according to the fixed parameter values and the initial selected combination of variable parameter values, the processor directing reception at the input means of a user indication of acceptability of the page layout and, if not acceptable, selecting  
15 another combination of variable parameter values, and generating and directing output at the output means of a page layout of advertisement text according to the fixed parameter values until an acceptable page layout is generated.

20 According to another aspect, the invention provides an operational process for setting a newspaper page layout of advertisements for optimum use of page space, the process being carried out by a typesetting apparatus comprising an input means, a processor, a memory, and an output means, and  
25 comprising the steps of:-

receiving at the input means and storing in the memory, text of advertisements for inclusion in a newspaper;

5 receiving at the input means and storing in the memory, values of fixed typesetting parameters of newspaper page dimensions, character fonts for text, column widths, inter-column spacing, and a numeral representing category of each classified advertisement for which text has been received;

10 receiving at the input means a set of allowed values for variable typesetting parameters, namely, vertical spacing between advertisements and order of printing of the classified advertisements according to the category numeral;

15 the processor retrieving the text, the fixed parameter values, and the variable parameter values from the memory and automatically selecting an initial combination of parameter values, and generating and directing output at the output means  
20 of a newspaper page layout of advertisement text according to the fixed parameter values and the initial selected combination of variable parameter values, the processor directing reception at the

input means of a user indication of acceptability of the page layout and, if not acceptable, selecting another combination of variable parameter values, and generating and directing output at the output means of a page layout of advertisement text according to the fixed parameter values until an acceptable page layout is generated.

In one embodiment, the step of selecting an initial combination of variable parameter values comprises the sub-steps of generating an initial page layout with a minimum allowed value of the spacing between advertisements and a sequential numerical order of the classified advertisements, checking for a blank space in the columns and eliminating the or each blank space by repetitively increasing the spacing value for the respective column.

In another embodiment, the step of selecting a further combination of parameter values comprises inserting into the blank space all advertisements of a category for which there are relatively few advertisements, said category being numerically out of sequential order.

The invention will be more clearly understood from the following description of some preferred embodiments thereof given by way of example only with reference to the accompanying drawings in which:-



Fig. 1 is a schematic representation of a typesetting apparatus of the invention; and

Fig. 2 is a flow diagram illustrating operation of the typesetting apparatus of Fig. 1.

5 Referring to the drawings, and initially to Fig. 1 there is illustrated a typesetting apparatus of the invention, indicated generally by the reference numeral 1. The typesetting apparatus 1 comprises a processor 2 arranged to direct the carrying out of a typesetting process. The  
10 processor 2 is connected in tandem with three other processors, not shown, each of which may take over the function of the processor 2 in the event of a fault. This arrangement ensures continuity of newspaper production for which the processor 2 carries out typesetting processes. The  
15 apparatus also includes an input buffer register 3 for reception of data from peripheral input devices which in this embodiment include a number of microcomputers 4 and a wire services transmission circuit 5. A scanner 6 for scanning of graphical images for printing in a newspaper may be connected  
20 to the input buffer register 3, however, in the following description it is assumed that the scanner 6 is not connected. The apparatus 1 also includes a memory buffer register 7 which handles communication between the processor 2 and memory devices including a random access memory circuit 8 and four

fixed discs 9(a) to 9(d). An output buffer register 10 handles communication of the processor 2 with output devices, in this embodiment comprising a typesetter 11 for printing of typeset newspaper pages, and one of the microcomputers 4. 5 Typeset newspaper pages 12 are illustrated.

For typesetting of newspaper pages containing advertisements, text of advertisements is keyed into the microcomputers 4 and the processor 2 directs storage of the text in one of the fixed discs 9(b) to 9(d). Text of both classified and display 10 advertisements is stored. Values of fixed typesetting parameters are also keyed into the microcomputers 4 and the processor 2 directs storage of these values in the fixed disc 9(a). In this embodiment, the fixed parameters include dimensions of a newspaper page, an indication of the fonts to 15 be used for character generation of the text, the widths of the columns, and the number of columns per newspaper page. Other fixed parameters include the gap between adjacent columns, generally referred to as the "gutter width" and a numeral for each classified advertisement for which text has 20 been received, the numeral representing a category for the advertisement. In this embodiment, the numerals are in blocks of a hundred, each block representing a main category. For example, all numerals beginning with "1" may relate to the main category of appointments and numerals within that block 25 would relate to categories of appointments such as "107" for sales appointments and "111" for teaching appointments. In

this embodiment, the categories represented by the numerals 200 through to 299 all relate to property dealings where, for example, the category identified by the numeral "251" relates to houses for sale and the category identified by the numeral "255" relates to accommodation offered. Each advertisement is assigned a category which is identified by a numeral and this parameter is fixed.

The apparatus 1 also receives at the microcomputers 4 sets of possible value for each of a number of variable typesetting parameters. In this embodiment, one variable parameter is the vertical spacing between advertisements in a column. A set of possible values are received ranging between a minimum spacing for acceptable reading clarity and a large maximum spacing just below that which would cause unacceptable discontinuity in a newspaper page. Another variable parameter is the order in which classified advertisements are printed in the newspaper. A numerical sequential order is preferable. However, alternatives for printing advertisements out-of-turn are allowed, provided the category includes a relatively small number of advertisements. For example, a category relating to businesses to let and identified by the numeral "275" may appear out of turn at the bottom of a column to fill a blank space, provided it includes no more two advertisements. The values specified are the range of the number of advertisements in a category which may be printed out-of-turn. The processor

2 directs storage of the variable parameter values in the fixed disc 9(a).

Referring specifically to Fig. 2, an operational process of the apparatus 1 is illustrated. An initial step 20 involves  
5 receiving and storing the advertisement text, and fixed and variable parameter values in the respective fixed discs 9(a) to 9(d). For typesetting, the processor 2 and the memory buffer register 7 retrieve the set of possible values for the variable parameter of vertical spacing between advertisements  
10 in a column, and store these values in the random access memory circuit 8 in step 21. The processor then determines the minimum spacing value by carrying out sorting operations in the random access memory circuit 8. Subsequently, for a particular page of a newspaper, advertisements are retrieved  
15 from the fixed discs 9(a) to 9(d) for storage in the random access circuit 8 in sequential order in step 22. The processor 2 then retrieves the values for the fixed parameters and sets a newspaper page layout in step 23 according to the fixed parameter values and the selected variable parameter  
20 values of minimum spacing between advertisements and sequential order of the advertisements. This is stored in the random access memory circuit 8. In step 24, the processor 2 checks if this page layout includes any blank spaces, which spaces will appear at the end of a column, for example, if  
25 advertisements for a main category end in the column. In step 25, the blank spaces in each column are eliminated by

repeatedly selecting increased values of vertical spacing between advertisements of the relevant column until the blank space is eliminated. For most columns, the blank space arises because an additional advertisement would lengthen the column  
5 beyond the maximum column length and such blank spaces are often less than the space taken by an average classified advertisement and are eliminated with a relatively small increase in the spacing between advertisements. However, for a column having advertisements at the end of a main category,  
10 say, category number 199, there may be a substantial blank space left in the column as the processor 2 directs starting of a new main category at the top of the next column. In step 26, the processor 2 automatically generates and directs displaying via the output buffer register 10 of the generated  
15 page layout at the microcomputer 4 which is connected to the output buffer register 10, provided the maximum allowable spacing value is not exceeded.

In step 27, the apparatus 1 receives an indication at a microcomputer 4 as to whether or not the page layout is  
20 acceptable and if not acceptable, the processor 2 in step 28 re-selects the minimum value for the spacing variable parameter and retrieves a category of advertisements for which out-of-turn printing is allowable and which has a number of advertisements below the upper limit. These advertisements  
25 are inserted into the blank space and the processor 2 carries out verification operations to check if the blank spaces are

adequately filled and if not, an alternative advertisement category is inserted in the blank space. Step 28 is carried out immediately, without display of a page layout if the maximum spacing value would be exceeded. When the blank space  
5 has been adequately filled the processor 2 again directs display of the page layout and the operations are repeated if the page layout is not acceptable. If acceptable, in step 29 the page layout is transmitted from the random access memory circuit 8 to one of the fixed discs 9(b) to 9(d) and is  
10 simultaneously transmitted to the typesetter 11 which contains the various required character fonts. The printed page 12 may then be used for printing of a newspaper in any suitable manner.

The allowed values of the variable parameters may be readily  
15 easily changed, for example, it may be desirable to include an advertisement category having a relatively large number of advertisements out-of-turn according to policy of newspaper management on certain days. As another example, the category "articles lost and found" may on selected days be printed at  
20 the beginning of the classified advertisement section of the newspaper, whereas it's numerical order would be at the end.

Regarding display advertisements, in this embodiment the apparatus 1 does not print some selected display advertisements but leaves spaces at the top of columns for  
25 insertion manually of these display advertisements after

printing at the typesetter 11. It is envisaged, however, that all of the display advertisements may be printed if the scanner 6 is connected for delivery of graphical images for display advertisements such as logos and drawings. Whether or  
5 not the display advertisements are printed, the text is stored in the fixed discs 9(b) to 9(d) for analysis and reporting purposes.

It will be appreciated that because the user is not required to set or to assist in setting a page layout, but merely to  
10 approve or disapprove of an automatically generated page layout, the time required for the typesetting process is significantly reduced. This is very important in a newspaper production process for which strict time deadlines must be met on a regular basis. Further, it will be appreciated that  
15 typesetting quality is considerably improved because the processor 2 automatically selects an optimum spacing between advertisements according to the most preferred selection of variable parameter values. This results in significant cost savings for purchasing of paper and for distribution of  
20 newspapers. It has been found that the typesetting process of the invention results in a saving of an average of a half column per page, compared with present typesetting processes.

While it has been stated that advertisements are represented by numerals, any other code such as an alpha-numeric code may

be used and the term "numeral" is intended to cover any such alternative code.

The invention is not limited to the embodiments hereinbefore described but may be varied in construction and detail.



CLAIMS

1. A typesetting apparatus comprising an input means, a processor, a memory, and an output means, the typesetting apparatus being operable to set a newspaper page layout of advertisements with optimum use of page space by performing the steps of:-

receiving at the input means and storing in the memory, text of advertisements for inclusion in a newspaper;

- receiving at the input means and storing in the memory, values of fixed typesetting parameters of newspaper page dimensions, character fonts for text, column widths, inter-column spacing, and a numeral representing category of each classified advertisement for which text has been received;

- receiving at the input means a set of allowed values for variable typesetting parameters, namely, vertical spacing between advertisements and order of printing of the classified advertisements according to the category numeral;

the processor retrieving the text, the fixed parameter values, and the variable parameter values

from the memory and automatically selecting an initial combination of variable parameter values, and generating and directing output at the output means of a newspaper page layout of advertisement text according to the fixed parameter values and the initial selected combination of variable parameter values, the processor directing reception at the input means of a user indication of acceptability of the page layout and, if not acceptable, selecting another combination of variable parameter values, and generating and directing output at the output means of a page layout of advertisement text according to the fixed parameter values until an acceptable page layout is generated.

2. A typesetting apparatus as claimed in claim 1, wherein the step of selecting an initial combination of variable parameter values comprises the sub-steps of generating an initial page layout with a minimum allowed value of the spacing between advertisements and a sequential numerical order of the classified advertisements, checking for a blank space in the columns and eliminating the or each blank space by repetitively increasing the spacing value for the respective column.

3. A typesetting apparatus as claimed in claims 1 or 2, wherein the step of selecting a further combination of

parameter values comprises inserting into the blank space all advertisements of a category for which there are relatively few advertisements, said category being numerically out of sequential order.

- 5    4.    An operational process for setting a newspaper page layout of advertisements for optimum use of page space, the process being carried out by a typesetting apparatus comprising an input means, a processor, a memory, and an output means, and comprising the steps of:-

10            receiving at the input means and storing in the memory, text of advertisements for inclusion in a newspaper;

15            receiving at the input means and storing in the memory, values of fixed typesetting parameters of newspaper page dimensions, character fonts for text, column widths, inter-column spacing, and a numeral representing category of each classified advertisement for which text has been received;

20            receiving at the input means a set of allowed values for variable typesetting parameters, namely, vertical spacing between advertisements and order of printing of the classified advertisements according to the category numeral;

the processor retrieving the text, the fixed  
parameter values, and the variable parameter values  
from the memory and automatically selecting an  
initial combination of variable parameter values,  
5 and generating and directing output at the output  
means of a newspaper page layout of advertisement  
text according to the fixed parameter values and the  
initial selected combination of variable parameter  
values, the processor directing reception at the  
10 input means of a user indication of acceptability of  
the page layout and, if not acceptable, selecting  
another combination of variable parameter values,  
and generating and directing output at the output  
means of a page layout of advertisement text  
15 according to the fixed parameter values until an  
acceptable page layout is generated.

5. An operational process as claimed in claim 4 wherein the  
step of selecting an initial combination of variable  
parameter values comprises the sub-steps of generating an  
20 initial page layout with a minimum allowed value of the  
spacing between advertisements and a sequential numerical  
order of the classified advertisements, checking for a  
blank space in the columns and eliminating the or each  
blank space by repetitively increasing the spacing value  
25 for the respective column.

6. An operational process as claimed in claim 4, wherein the step of selecting a further combination of parameter values comprises inserting into the blank space all advertisements of a category for which there are relatively few advertisements, said category being numerically out of sequential order.
7. A typesetting apparatus substantially as hereinbefore described with reference to, and as illustrated in the accompanying drawings.
- 10 8. An operational process substantially as hereinbefore described with reference to, and as illustrated in the accompanying drawings.